

1. A field emission device comprising an emitter tip formed from and integral
2 with an emitter layer, the emitter tip having a height and including a base and an apex,
3 wherein said emitter tip has a substantially rectilinear profile between said base and said
4 apex, said substantially rectilinear profile being defined by a tip arc length and a tip chord
5 length, wherein the ratio of said arc length to said chord length is less than or equal to about
6 1.2:1.

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8 2. A field emission device according to claim 1, wherein the ratio of said tip arc
9 length to said tip chord length is less than or equal to about 1.1:1.

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11 3. A field emission device according to claim 1, wherein the ratio of said tip arc
12 length to said tip chord length is less than or equal to about 1.05:1.

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14 4. A field emission device according to claim 1, wherein the ratio of said tip arc
15 length to said tip chord length is less than or equal to about 1.01:1.

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5. A field emission device comprising:
an emitter layer including an emitter tip that has a height and including a base and an apex, wherein said emitter tip has a rectilinear profile between said base and said apex that is defined by a tip arc length and a tip chord length, wherein the ratio of said arc length to said chord length is less than or equal to about 1.2:1;
a substrate; and
a cathode conductive layer disposed over said substrate, said emitter tip being disposed over said cathode conductive layer.

6. A field emission device according to Claim 5, further comprising:
a conductive gate structure disposed over said cathode conductive layer;
an aperture through said conductive gate structure, said emitter tip being exposed within said aperture; and
an anode panel positioned over said conductive gate structure and said emitter tip.

7. A field emission device according to Claim 6, wherein said anode plane comprises:
an anode conductive layer;
a phospholuminescent panel for emitting light upon being excited by electrons; and
a transparent panel.

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8. A flat panel display device comprising:
a substrate;
a cathode conductive layer disposed over said substrate;
an array of emitter tips each formed from an emitter layer disposed over said substrate, each of said emitter tips having a height and including a base and an apex, each of said emitter tips having a substantially rectilinear profile between said base and said apex that is defined by a tip arc length and a tip chord length, wherein the ratio of said arc length to said chord length is less than or equal to about 1.2:1;
a conductive gate structure disposed over said cathode conductive layer;
an array of apertures formed through said conductive gate structure, each of said emitter tips being exposed through one of said apertures; and
an anode panel for emitting light in response to electrons emitted from said array of emitter tips.

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- 1 9. A field emission device comprising:
2 a substrate;
3 a cathode conductive layer disposed over said substrate; and
4 an emitter tip integral with an emitter layer disposed over said cathode
5 conductive layer and having a base, an apex, and a continuously concave exterior
6 surface extending from the base to the apex.

- 7 10. A field emission device according to Claim 9, further comprising:
8 a conductive gate structure disposed over said cathode conductive layer;
9 an aperture through said conductive gate structure, said emitter tip being
10 exposed within said aperture; and
11 an anode panel positioned over said conductive gate structure and said emitter
12 tip.

- 13 11. A field emission device according to Claim 10, wherein said anode panel
14 comprises:
15 an anode conductive layer;
16 a phospholuminescent panel for emitting light upon being excited by
17 electrons; and
18 a transparent panel.

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1 12. A field emission device comprising:
2 a substrate;
3 a cathode conductive layer disposed over said substrate; and
4 an emitter tip projecting from and integral with an emitter layer disposed over
5 said cathode conductive layer and having a base, an apex, and an exterior surface,
6 said exterior surface having a substantially paraboloid vertical profile that extends
7 from the base to the apex.

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9 13. A field emission device according to Claim 12, further comprising:
10 a conductive gate structure disposed over said cathode conductive layer;
11 an aperture through said conductive gate structure, said emitter tip being
12 exposed within said aperture; and
13 an anode panel positioned over said conductive gate structure and said emitter
14 tip.

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16 14. A field emission device according to Claim 13, wherein said anode panel
17 comprises:
18 an anode conductive layer;
19 a phospholuminescent panel for emitting light upon being excited by
20 electrons; and
21 a transparent panel.

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3 15. A field emission device comprising:
4 a substrate;
5 a cathode conductive layer disposed over said substrate; and
6 an emitter tip that is an integral portion of a single emitter layer disposed over
7 said cathode conductive layer and having a base, an apex, and an exterior surface,
8 said exterior surface having an ovoid profile that extends from the base to the apex.

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10 16. A field emission device according to Claim 15, further comprising:
11 a conductive gate structure disposed over said cathode conductive layer;
12 an aperture through said conductive gate structure, said emitter tip being
13 exposed within said aperture; and
14 an anode panel positioned over said conductive gate structure and said emitter
15 tip.

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17 17. A field emission device according to Claim 16, wherein said anode panel
18 comprises:
19 an anode conductive layer;
20 a phospholuminescent panel for emitting light upon being excited by
21 electrons; and
22 a transparent panel.

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1 18. A field emission device comprising an emitter tip formed from an emitter
2 layer, the emitter tip having a height and including a base and an apex, wherein said emitter
3 tip is generally conical and has a substantially rectilinear profile between said base and said
4 apex.

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6 19. A field emission device according to Claim 18, wherein said substantially
7 rectilinear profile is defined by a tip arc length and a tip chord length, wherein the ratio of
8 said arc length to said chord length is less than or equal to about 1.2:1.

1 20. A flat panel display device comprising:
2 a substrate;
3 a cathode conductive layer disposed over said substrate;
4 an array of emitter tips formed as a part of an emitter layer disposed over said
5 substrate, each of said emitter tips having a height and including a base and an apex,
6 each of said emitter tips having an exterior surface, said exterior surface having a
7 profile with a continuous shape that extends from the base to the apex, said
8 continuous shape being selected from the group consisting of a concave shape, a
9 substantially paraboloid shape, and an ovoid shape;
10 a conductive gate structure disposed over said cathode conductive layer;
11 an array of apertures formed through said conductive gate structure, each of
12 said emitter tips being exposed through one of said apertures; and
13 an anode panel for emitting light in response to electrons emitted from said
14 array of emitter tips.